

ART 34 A EPO

CLAIMS:

1. A hand-held device comprising:

5 a processor;

a display;

10 a digital camera for capturing motion video or still images;

means for presenting still images or motion video captured by said digital camera on said display;

15 means for transforming a signal from the camera into a motion signal indicative of the motion of the hand-held device; and

20 a user interface in which motion of the hand-held device is - through the motion signal derived thereof - used as a user input to control operation of the hand-held device.

25 2. A hand-held device according to claim 1, in which motion of a given type of the hand-held device is used to manipulate images shown at least in part on the display, preferably by moving the images in a manner substantially corresponding to the movement of the hand-held device.

30 3. A hand-held device according to claim 2, in which a given type of motion the hand-held device is used to move, and/or zoom, and/or expand/collapse and/or rotate images displayed on the display.

35 4. A hand-held device according to claim 3, in which motion substantially parallel to the plane of the display of the

hand-held device is used to scroll an image displayed on the display, and/or motion substantially perpendicular to the plane of the display is used to zoom an image displayed on the display and/or rotational motion of the hand-held device is used to rotate an image displayed on the display.

5. A hand-held device according to any of claims 2 to 4, in which the images are images previously captured by the camera.

10 6. A hand-held device according to any of claims 2 to 5, in which movement of image is inverted with respect to motion of the hand-held device.

15 7. A hand-held device according to any of claims 1 to 6, in which the user interface comprises a graphical user interface, and wherein motion of the hand-held device is used as an input to the graphical user interface.

20 8. A hand-held device according to claim 2, in which motion of the hand-held device is used to manipulate an object displayed by the graphical user interface, preferably by moving the object in a manner substantially corresponding to the motion or to the inverted motion of the hand-held device, whereby the object displayed by the graphical user interface can be, an icon, a dialogue box, a window, a menu or a pointer.

30 9. A hand-held device according to claim 7, in which motion of a given type of the hand-held device is used to move, and/or zoom, and/or expand/collapse and/or rotate objects displayed by the graphical user interface.

35 10. A hand-held device according to claim 9, in which motion substantially parallel to the plane of the display of the hand-held device is used to scroll an object displayed by the graphical user interface, and/or motion substantially perpendicular to the plane of the display is used to zoom an

object displayed by the graphical user interface and/or rotational motion of the hand-held device is used to rotate an object displayed by the graphical user interface.

5 11. A hand-held device according to any of claims 1 to 10, in which the digital camera is detachable.

12. A hand-held device according to any of claims 1 to 11, in which the digital camera is movable relative to the hand-held  
10 device.

13. A hand-held device according to any of claims 1 to 12, in which the means for transforming a signal from the camera into a motion signal derives the motion signal from changes between  
15 succeeding images, or parts of succeeding images captured by the camera.

14. A hand-held device according to any of claims 1 to 13, in which the camera has an autofocus system, whereby the focusing  
20 setting of the autofocus system is used for detecting movement in the camera direction.

15. A hand-held device according to any of claims 1 to 14, further comprising at least one key, wherein the functionality  
25 of a motion type is dependent on the state of the at least one key.

16. A hand-held device according to any of claims 1 to 15, in which rotational motion of the hand-held device about an axis  
30 substantially perpendicular to the display results in an inverse rotational movement of the image or graphical user interface object relative to the display, preferably in a manner such that the image or object is static with respect to the fixed coordinate system in which the hand-held device is  
35 situated.

17. A hand-held device according to any of claims 1 to 16 in which the motion signal is used to adjust device settings, the device settings preferably comprising sound settings and display settings.

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18. A hand-held device according to any of claims 7 to 17, further comprising a keypad with at least a first- and a second key and the graphical user interface comprises a cursor, whereby motion of the hand-held device is used to position the cursor over an object of the graphical user interface and primary functions associated with the object concerned are activated by pressing the first key and secondary functions associated with the object of the concerned are activated by pressing the second key.

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19. A hand-held device according to claim 18, in which the functionality of the first key is associated with selection and activation of objects of the graphical user interface, and in which the functionality of the second key is preferably associated with calling up a context-sensitive menu.

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20. A hand-held device according to claim 19, in which selection of the object concerned is performed by pressing and releasing the first key, and activation of the object concerned is preferably performed by pressing and releasing the first key twice in rapid succession.

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21. A hand-held device according to claim 19 or 20, in which moving or resizing of the object concerned is performed by holding down the first key while moving the hand-held device to move the cursor.

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22. A hand-held device according to any of claims 18 to 21, in which the first key and the second key are softkeys whereby the current functionality of the softkeys is shown in the display, preferably in dedicated fields of the display.

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23. A hand-held device according to claim 22, in which the first key is placed below the display on the left side of the latter, preferably proximate to lower edge of the display, and  
5 the second key is placed below the display on the right side of the latter, preferably proximate to lower edge of the display.

24. A hand-held device according to any of claims 1 to 23,  
10 further comprising at least one gravity based tilt sensor, and whereby the signal from the at least one tilt sensor is used in combination with the signal from the camera for creating the motion signal.

15 25. A hand-held device according to claim 24, wherein a tilt sensor is associated with the X-axis and/or a tilt sensor is associated with the Z-axis.

26. A hand-held device according to claim 25, wherein the  
20 signal from the at least one tilt sensor is used to determine the absolute orientation of the handheld device relative to the direction of the gravitational pull.

27. A hand-held device according to any of claims 1 to 26,  
25 further comprising means for sending the motion signal to another terminal via cable, infrared waves or radio frequency waves.

28. A system comprising a hand-held device according to claim  
30 27 and a terminal capable of displaying imaginary three-dimensional objects on a two-dimensional screen, said terminal comprising means to change the orientation of the displayed object in response to signals received from the handheld device, whereby orientation changes of the hand-held device  
35 are translated to corresponding orientation changes of the displayed object.

29. A system according to claim 28, in which position changes of the handheld device are translated to position changes of the displayed object.

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30. A system comprising a hand-held device according to claim 27 and a terminal capable of displaying an imaginary three-dimensional space on a two-dimensional screen, said terminal comprising means to change the viewing position in the  
10 imaginary three-dimensional space in response to signals received from the handheld device, whereby positional changes of the hand-held device are translated to corresponding changes in the viewing position.

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31. A system according to claim 28, in which orientation changes of the handheld device are translated into corresponding changes in the viewing direction in the imaginary three-dimensional space.

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32. A method for creating user input for a hand-held device that has a processor, a user interface and a digital camera for capturing motion video or still images comprising the steps of:

obtaining a camera signal;  
25 alternatingly using the camera signal to:  
capture still images or motion video; or  
to determine motion of the hand-held device from the camera signal; and to  
use the determined motion of the hand-held device as an  
30 input for the user interface.

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33. Use of a digital camera in a hand-held device for both capturing motion video or still images and for producing a motion signal indicative of motion of the hand-held device.

34. A hand-held device comprising a processor, means for sensing motion of the hand-held device, a display, a keypad with at least a first- and a second key, a graphical user interface with objects and a cursor, and means for transforming the sensed motion of the handheld device into a signal suitable for moving the cursor over the display.

35. A hand-held device according to claim 34, in which motion of the hand-held device is used to position the cursor over an object of the graphical user interface and primary functions associated with the object concerned are activated by pressing the first key and secondary functions associated with the object concerned are activated by pressing the second key.

36. A hand-held device according to claim 35, in which the functionality of the first key is associated with selection and activation of objects of the graphical user interface, and in which the functionality of the second key is preferably associated with calling up a context-sensitive menu.

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37. A hand-held device according to claim 36, in which selection of the object concerned is performed by pressing and releasing the first key, and activation of the object concerned is preferably performed by pressing and releasing the first key twice in rapid succession.

38. A hand-held device according to claim 36 or 37, in which moving or resizing of the object concerned is performed by holding down the first key while moving the hand-held device to move the cursor and the object concerned in unison therewith.

39. A hand-held device according to any of claims 34 to 38, in which the first key and the second key are softkeys whereby the current functionality of the softkeys is shown in the display, preferably in dedicated fields of the display.

40. A hand-held device according to claim 39, in which the first key is placed below the display on the left side of the latter, preferably proximate to lower edge of the display, and  
5 the second key is placed below the display on the right side of the latter, preferably proximate to lower edge of the display.

41. A hand-held device according to any of claims 34 to 40, in  
10 which said means for transforming motion of the handheld device into a signal suitable for moving the cursor over the display comprises a tilt sensor and/or an image capturing device and/or an accelerometer.

15 42. A hand-held device according to claim 41, in which said image capturing device is a motion video or still image digital camera.

43. A hand-held device according to any of claims 34 to 42,  
20 further comprising means to transform a signal from the camera and/or tilt sensor and/or accelerometer into a position signal for the cursor.

44. A hand-held device according to claim 43, in which said  
25 means for transforming a signal from the camera into a motion signal derives the motion signal from changes between succeeding images, or parts of succeeding images captured by the camera.

30 45. A hand-held device according to any of claims 42 to 44, in which the camera has an autofocus system, whereby the focusing setting of the autofocus system is used for detecting movement in the camera direction.

35 46. A hand-held device according to any of claims 34 to 45, in which the graphical user interface includes one or more of the



following object types: icons, dialogue boxes, windows, menus,  
pointers.

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